We claim:

1. A method for allocating channels from among a group of available channels, to one or more cells within a wireless LAN (WLAN), without causing unacceptable interference comprising:

dividing a time period into frames, each frame having a substantially short duration;

generating, for each frame, a set of active WLAN cells from the one or more cells based on an allocation vector;

allocating, for each frame and to each one of the one or more active WLAN cells, one or more channels from among the group of available channels;

permitting the active WLAN cells, during a given frame, to transmit; and

preventing WLAN cells, that are not allocated a channel during a given frame, from transmitting during the given frame.

2. The method as in claim 1 further comprising allocating, during each frame, a channel from the set of available channels to more than one active cell substantially simultaneously.

3. The method as in claim 1 wherein each cell which is allocated a same channel as any other cell during the given frame is sufficiently distant from each other cell allocated the same channel to minimize cross interference.

4. The method as in claim 3 further comprising allocating during each frame and to each active cell, one channel from the set of available channels.

5. The method as in claim 1 wherein the set of channels available for allocation may vary with time.

6. The method as in claim 1 wherein the duration of each frame is substantially the same.

7. The method as in claim 1 wherein the duration of each frame is substantially different.

8. The method as in claim 1 wherein the set of available channels comprises radio frequency channels.

9. The method as in claim 1 further comprising allocating the one or more channels to the one or more active WLAN cells at the beginning of the frame.

10. The method as in claim 4 further comprising generating the set of active WLAN cells from an activation vector during the given frame.

11. The method as in claim 4 further comprising allocating, during each frame, the one or more channels to the one or more active cells based on an allocation vector that satisfies a maximum allowed cross interference.

12. The method as in claim 4 further comprising allocating, during each frame, one or more channels to the one or more active WLANs that satisfy a maximum allowed cross interference given by:

$$a_l^n\left(I_{o,l}^n + \sum_{k=1}^{L} a_k^n \cdot I_{k,l}\right) \leq I_l^{\max}, n = 1,2,\cdots, N, l = 1,2,\cdots,L,$$

where L denotes a number of cells, N denotes a number of available channels, $I_{o,l}^n$ denotes an amount of external interference within a channel n to a cell l, a_l^n denotes entries of the channel allocation vector, defined as

$$a_l^n \overset{\text{def}}{=\!=} \begin{cases} 1 & \text{channel } n \text{ is allocated to } l \text{ during the frame under consideration,} \\ 0 & \text{otherwise.} \end{cases}, \ I_{k,l}$$

denotes the cross interference from cell k to cell l when both cells k and l operate over the same channel, and $I_l^{\max}$ denotes the maximum allowance cross interference.

13. The method as in claim 11 further comprising selecting the allocation vector from among a set of maximally feasible allocation vectors.

14. The method as in claim 13 further comprising selecting an allocation vector defined by:

$$A^* = \arg \max_{\forall A \in F} \sum_{l=1}^{L} \hat{a}_l \cdot w_l$$

where w_l are positive weights associated with each cell, l, and F is the set of feasible allocation vectors.

15. The method as in claim 14 wherein the weights, w_l, may change from frame to frame and the selection of an allocation vector is repeated on a per frame basis.

16. The method as in claim 15 wherein a Maximum Queue Length Channel Allocation is defined by choosing weights $w_l = q_l$, where q_l is the length of a virtual queue of l at the beginning of each corresponding frame.

17. A controller, for allocating channels from among a group of available channels to one or more cells within a wireless LAN (WLAN) without causing unacceptable interference, operable to:

divide a time period into frames, each frame having a substantially short duration;

generate, for each frame, a set of active WLAN cells from the one or more cells based on an allocation vector;

allocate, for each frame, and to each one of the one or more active WLAN cells, one or more channels from among the group of available channels;

permit the active WLAN cells, during a given frame, to transmit; and

prevent WLAN cells, that are not allocated a channel during a given frame, from transmitting during the given frame.

18. The controller as in claim 17 further operable to allocate, during each frame, a channel from the set of available channels to more than one active cell substantially simultaneously.

19. The controller as in claim 17 wherein each cell which is allocated a same channel as any other cell during the given frame is sufficiently distant from each other cell allocated the same channel to minimize cross interference.

20. The controller as in claim 19 further operable to allocate, during each frame and to each active cell, one channel from the set of available channels.

21. The controller as in claim 17 wherein the set of channels available for allocation may vary with time.

22. The controller as in claim 17 wherein the duration of each frame is substantially the same.

23. The controller as in claim 17 wherein the duration of each frame is substantially different.

24. The controller as in claim 17 wherein the one or more channels comprise radio frequency channels.

25. The controller as in claim 17 further operable to allocate the one or more channels to the one or more WLAN cells at the beginning of the frame.

26. The controller as in claim 20 further operable to generate the set of active WLAN cells from an activation vector during the given frame.

27. The controller as in claim 20 further operable to allocate, during each frame, the one or more channels to the one or more active cells based on an allocation vector that satisfies a maximum allowed cross interference.

28. The controller as in claim 20 further operable to allocate, during each frame, one or more channels to the one or more WLANs that satisfy a maximum allowed cross interference given by:

$$a_l^n\left(I_{o,l}^n + \sum_{k=1}^{L} a_k^n \cdot I_{k,l}\right) \le I_l^{\max}, n = 1,2,\cdots,N, l = 1,2,\cdots,L,$$

where L denotes a number of cells, N denotes a number of available channels, $I_{o,l}^n$ denotes an amount of external interference within a channel n to a cell l, a_l^n denotes entries of the channel allocation vector, defined

as $a_l^n \stackrel{\text{def}}{=} \begin{cases} 1 & \text{channel } n \text{ is allocated to } l \text{ during the frame under consideration,} \\ 0 & \text{otherwise.} \end{cases}$, $I_{k,l}$ denotes the cross interference from cell k to cell l when both cells k and l operate over the same channel, and $I_l^{\max}$ denotes the maximum allowable cross interference.

29. The controller as in claim 28 further operable to select the allocation vector from among a set of maximally feasible allocation vectors.

30. The controller as in claim 29 further operable to select an allocation vector defined by:

$$A^* = \arg\max_{\forall A \in F} \sum_{l=1}^{L} \hat{a}_l \cdot w_l$$

where w_l are positive weights associated with each cell, l, and F is the set of feasible allocation vectors.

31. The controller as in claim 30 wherein the weights, w_l, may change from frame to frame and the selection of an allocation vector is repeated on a per frame basis.

32. The controller as in claim 31 wherein a Maximum Queue Length Channel Allocation is defined by choosing weights $w_l = q_l$, where q_l is the length of a virtual queue of l at the beginning of each corresponding frame.